



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE

HONORABLE BOARD OF PATENT APPEALS AND INTERFERENCES

In re patent application of

Dong-Gyu KIM

Serial No.: 09/164,392

Confirmation No.: 6608

Filed: September 30, 1998

Docket No.: 6192.0081.AA

Group Art Unit: 2674

Examiner: LANEAU, Ronald

For: **LIQUID CRYSTAL DISPLAY AND A METHOD FOR DRIVING THE SAME**

Mail Stop: Appeal Brief (Patents)

Commissioner for Patents

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APPEAL BRIEF

Sir:

Applicant/Appellant of the above-referenced application hereby submits an original and two copies of this Appeal Brief to the Honorable Board of Patent Appeals and Interferences in support of Appellant's Notice of Appeal filed and received at the U.S. Patent and Trademark Office on June 29, 2004.

If these papers are not considered timely filed by the Patent and Trademark Office, then a petition is hereby made under 37 C.F.R. § 1.136, and any additional fees required under 37 C.F.R. § 1.136 for any necessary extension of time, or any other fees required to complete the filing of this response, may be charged to Deposit Account No. 23-1951. Please credit any overpayment to deposit Account No. 23-1951.

I. REAL PARTY IN INTEREST

The real party of interest is Samsung Electronics Co., Ltd., a corporation of Republic of Korea.

II. RELATED APPEALS AND INTERFERENCES

The Appellant is unaware of any related appeals or interferences related to the above-referenced application.

III. STATUS OF CLAIMS

Claims 1-21 are pending in the present application, of which claims 1, 6 and 17 are independent. Claims 1-21 have been finally rejected. It is from the final rejection of claims 1-21 that this Appeal is taken¹.

IV. STATUS OF AMENDMENTS

Request for Reconsideration under 37 C.F.R. §1.116 has been filed on April 26, 2004 subsequent to the issuance of the Final Office Action dated January 29, 2004. Advisory Action was issued on May 25, 2004 to indicate that the Request for Reconsideration has been considered but does not place the application in condition for allowance because (a) the Examiner's understanding of the claimed invention is the same with what Applicant explained in the Request for Reconsideration and (b) the Examiner still finds the claimed invention unpatentable. A Notice of Appeal was timely filed on June 29, 2004.

¹ Claims 11, 12, 14 and 15 have been indicated as containing allowable subject matter but objected to for being dependent from rejected independent claim 6.

V. SUMMARY OF THE INVENTION

In the liquid crystal display technology, an inversion driving method has been widely adopted, such as dot inversion, line inversion, column inversion and frame inversion. Among them, the dot inversion and column inversion have been more commonly used than other inversion driving methods.

However, due to misalignment and differences in widths during the actual patterning process, coupling capacitances between the pixel electrode and the adjacent data lines become dissimilar. This influences pixel brightness. Also, if two adjacent pixel electrodes are shorted, the pixel voltages become similar to the common voltage. This causes the shorted pixels to constantly display white, which is an indicative of defective pixels.

To solve these problems, the present invention groups together a plurality of pixels adjacent to each other, applies data voltages of the same polarity to the pixels of the same group and increases the distance between two pixel groups.

Since the pixels in the same group have the same polarity, the pixel voltages of the same group are changed in the same direction by the coupling capacitances. Thus, the brightness difference is significantly reduced as compared to the conventional dot and column inversion. Also, the pixels in the same group have the same polarity, even if two of them is shorted, it shows black in a normal state. Thus, the claimed invention reduces the pixel defects. Further, the increased distance between two pixel groups reduces the coupling capacitance between two different polarities, thereby preventing inaccurate brightness display.

These are achieved by the method of independent claim 1 and the structures of independent claims 6 and 17.

Important features of the present invention are as follows:

- A. Dividing a plurality of pixel electrode into a plurality of pixel groups, each pixel comprising a plurality of pixels adjacent to each other (Claims 1-21).
- B. Applying a data voltage of the same polarity to the pixels in the same pixel group (Claims 1-6).
- C. The polarities of the data voltage applied to pixels are inverted in a unit of a pixel group per frame (Claims 7-21)
- D. The first distance between the first data line for the first pixel electrode of the first pixel group and the second pixel electrode of the second pixel group adjacent to the first pixel electrode is greater than the second distance between the second data line for the second pixel electrode and the third pixel electrode of the second pixel group adjoining the second data line (Claims 1-21).

VI. ISSUES ON APPEAL

1. Rejections

- A. Independent claims 1, 6 and 17 and dependent claims 4, 5, 9, 10 and 18 stand finally rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 5,790,092 issued to Moriyama (hereafter "Moriyama") in view of U. S. Patent No. 5,604,358 issued to Kim (hereafter "Kim").
- B. Dependent claims 2, 3, 7, 8, 13, 16 and 19-21 stand finally rejected under 35 U.S.C. §103(a) as being unpatentable over Moriyama in view of U. S. Patent No. 6,295,043 issued to Hashimoto, et al. (hereafter "Hashimoto"), and further in view of Kim.

2. The Issues which Arise in this Appeal and Requires resolution by the Honorable Board of Patent Appeals and Interferences are:

- A. Whether Kim discloses the claimed "a first distance between a first data line for a first pixel electrode of a first pixel group and a second pixel electrode of a second pixel group adjacent to the first pixel electrode is greater than a second distance between a second data line for the second pixel electrode and a third pixel electrode of the second pixel group adjoining the second data line" as required by independent claims 1, 6 and 17.
- B. Whether the claimed invention would have been obvious in view of Moriyama in view of Kim.

VII. GROUPING OF THE CLAIMS

Since claim 1-21 stand or fall together, no grouping of the claims is necessary.

VIII. ARGUMENTS

A Prima Facie Case of Obviousness Has Not Been Established

It is well established that the PTO has the initial burden of establishing a *prima facie* cases of obviousness to deny patentability to the claimed invention. *In re Mayne*, 104 F. 3d 1339, 41 USPQ 2d 1451 (Fed. Cir. 1997). Appellants respectfully submit that the Patent and Trademark Office (PTO) did not discharge its initial burden of establishing a *prima facie* case of obviousness to deny patentability to the claimed invention under 35 U.S.C. §103(a) for lack of the requisite factual basis.

Appellant will show that (a) the PTO's factual determinations are inaccurate, and (b) the PTO has committed a legal error in arriving at the obviousness conclusion.

A. INACCURATE FACTUAL DETERMINATION

Independent claims 1, 6 and 17 recite "a first distance between a first data line for a first pixel electrode of a first pixel group and a second pixel electrode of a second pixel group adjacent to the first pixel electrode is greater than a second distance between a second data line for the second pixel electrode and a third pixel electrode of the second pixel group adjoining the second data line".

As explained repeatedly in Appellant's responses filed on August 27, 2003 and April 26, 2004, Fig. 10 of the present application shows an example of the claimed features. Fig. 10 shows four pixel electrodes. The left three pixel electrodes are labeled "R", "G" and "B". Also, they are indicated with "+". This explains that "the polarity of the data voltage applied to" these pixels "is the same" (i.e., (+) polarity) and therefore these three pixel electrodes are "in the same pixel group". The data lines D1, D2 and D3 are provided corresponding to these three pixel electrodes, respectively. There is one more pixel electrode on the right side. That pixel electrode is labeled "R" and its polarity is indicated as "-". This means that the pixel electrode has a different polarity (i.e., (-) polarity) and therefore belongs to a different pixel group. The data line D4 is provided to this pixel electrode.

In Fig. 10, there are two different distances labeled "d1" and "d2". The distance "d1" is *a distance between the pixel electrode labeled "R" (far left) and the data line D2* for the pixel electrode labeled "G". Both the pixel electrodes labeled "R" and "G" are in the same pixel group and have the same (+) polarity, as explained above. The distance "d2" is a distance between *the*

pixel electrode “B” and the data line D4 for the pixel labeled “R” (far right). The pixel electrode labeled “B” and the pixel electrode labeled “R” are not in the same group and have different polarities. The pixel electrode labeled “B” has the (+) polarity and the pixel electrode labeled “R” has the (-) polarity. Fig. 10 shows the distance D2 is greater than D1.

The PTO has maintained the position that Kim shows this claimed feature. Appellant respectfully disagrees. Kim is directed to forming a data line with three separate parts. In Kim, the first data line 13 is basically a drain electrode connected to a pixel electrode 17, and the second data line 14 is basically a data line extending vertically. The unique part of Kim is that the second data line 14 is formed on the same plane with the gate line 12 and disconnected at the points where the gate lines 12 and the second data lines 14 would have met each other. Since the second data lines 14 are disconnected, the third data line 16 is formed to interconnect the disconnected portions of the second data lines 14.

Kim fails to disclose or even remotely suggest “a first distance ... is *greater than* a second distance ...”, as recited in independent claims 1, 6 and 17. Also, as mentioned above, the subject matter of Kim is very distant from that of the claimed invention. Accordingly, Appellant respectfully submits that the PTO’s factual determination that Kim discloses the above-mentioned claimed feature is inaccurate and has no factual support.

B. ERRONEOUS CONCLUSION OF OBVIOUSNESS

To establish a prima facie case of obviousness, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). As mentioned above, Moriyama and Kim, singly or in combination, do not disclose or suggest “a first distance between a first data line for a first pixel electrode of a first pixel group and a second

pixel electrode of a second pixel group adjacent to the first pixel electrode is greater than a second distance between a second data line for the second pixel electrode and a third pixel electrode of the second pixel group adjoining the second data line”, as recited in claims 1, 6 and 17. Since the applied prior art fails to disclose or suggest the above-mentioned claim limitation, PTO fails to establish a *prima facie* case of obviousness. Accordingly, it is respectfully submitted that the PTO has committed a legal error in arriving at the obviousness conclusion based on inaccurate factual determination.

IX. CONCLUSION

Based upon the arguments, Appellants submit that the PTO has failed to establish a *prima facie* case of obviousness to deny patentability to the claimed invention for lack of the requisite factual basis. None of the references singly or in combination teaches or suggests a combination of elements including, for example, “a first distance between a first data line for a first pixel electrode of a first pixel group and a second pixel electrode of a second pixel group adjacent to the first pixel electrode is greater than a second distance between a second data line for the second pixel electrode and a third pixel electrode of the second pixel group adjoining the second data line” as required by independent claim 1, 6 and 17.

X. PRAYER FOR RELIEF

For reasons set forth above, Appellants respectfully submit that the PTO did not establish a *prima facie* case of obviousness to deny patentability to the claimed invention under 35 U.S.C. §103. Accordingly, Appellants respectfully solicit the Honorable Board of Patent Appeals and Interferences to reverse the Examiner’s rejections under 35 U.S.C. § 103.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'Hae-Chan Park', with a stylized, flowing script.

Hae-Chan Park
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Date: September 29, 2004

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APPENDIX: CLAIMS

1. A method for driving a liquid crystal display having a plurality of gate lines and data lines intersecting each other, a matrix of a plurality of pixels, each pixel including a pixel electrode, a common electrode extended to each pixel, comprising steps of:

dividing the plurality of pixels into a plurality of pixel groups, each pixel group comprising a plurality of pixels adjacent to each other;

applying a common voltage to the common electrode; and

applying a data voltage of a positive polarity or a negative polarity with respect to the common voltage alternately to each pixel group per frame,

wherein the polarity of the data voltage applied to the pixels in the same pixel group is the same, and

a first distance between a first data line for a first pixel electrode of a first pixel group and a second pixel electrode of a second pixel group adjacent to the first pixel electrode is greater than a second distance between a second data line for the second pixel electrode and a third pixel electrode of the second pixel group adjoining the second data line.

2. The method according to claim 1, wherein each pixel group comprises three pixels.

3. The method according to claim 2, wherein each pixel group comprises a red pixel, a green pixel, and a blue pixel.

4. The method according to claim 1, wherein data voltages having the same polarity with respect to the common voltage are applied to the adjacent pixels in the same column.

5. The method according to claim 1, wherein data voltages having different polarities with respect to the common voltage are applied to the adjacent pixels on the same column.

6. A liquid crystal display, comprising:
a substrate;
a plurality of gate lines formed on the substrate;
a plurality of data lines insulated from and intersecting the gate lines and transmitting a data voltage; and
a plurality of pixels formed corresponding to respective regions defined by the data lines and the gate lines, the plurality of pixels being divided into a plurality of pixel groups, each pixel group comprising two or more pixels, each pixel including a pixel electrode,
wherein a common voltage is applied to the plurality of pixels, and polarities of the data voltage with respect to the common voltage are inverted in a unit of a pixel group per frame, and
a first distance between a first data line for a first pixel electrode of a first pixel group and a second pixel electrode of a second pixel group adjacent to the first pixel electrode is greater than a second distance between a second data line for the second pixel electrode and a third pixel electrode of the second pixel group adjoining the second data line.

7. The LCD according to claim 6, wherein each pixel group comprises three pixels.

8. The LCD according to claim 7, wherein each pixel group comprises a red pixel, a green pixel, and a blue pixel.

9. The LCD according to claim 6, wherein the first distance is two to six times greater than the second distance.

10. The LCD according to claim 9, wherein the first distance is four times greater than the second distance.

11. The LCD according to claim 6, wherein the gate lines are divided into gate line groups, each gate line group comprising a first gate line, a second gate line adjacent to the first gate line, and a connecting member coupled between the first gate line and the second gate line.

12. The LCD according to claim 11, wherein the connecting member is interposed between pixels of different pixel groups.

13. The LCD according to claim 6, wherein the common voltage is applied through a common electrode formed on the substrate.

14. The LCD according to claim 13, wherein a plurality of common lines are connected to the common electrode, and

the plurality of common lines are divided into a plurality of common line group, each common line group comprising a first common line, a second common line, and a connecting member coupled between the first common line and a second common line.

15. The LCD according to claim 14, wherein the connecting member is interposed between pixels of different pixel groups.

16. The method according to claim 1, wherein the pixel group comprises a column of red pixels, a column of green pixels and a column of blue pixels.

17. A liquid crystal display (LCD), comprising:
a substrate;
a plurality of gate lines formed on the substrate;
a plurality of data lines insulated from and intersecting the gate lines and transmitting a data voltage; and
a plurality of pixels formed corresponding to respective regions defined by the data lines and the gate lines, the plurality of pixels being divided into a plurality of pixel groups, at least one of the pixel groups comprising two or more pixels, wherein each pixel comprises a thin film transistor and a pixel electrode connected to the thin film transistor,
wherein a common voltage is applied to the plurality of pixels, and polarities of the data voltage with respect to the common voltage are inverted in a unit of pixel group per frame, and
a first distance between a first data line for a first pixel electrode of a first pixel group and a second pixel electrode of a second pixel group adjacent to the first pixel electrode is greater

than a second distance between a second data line for the second pixel electrode and a third pixel electrode of the second pixel group adjoining the second data line.

18. The LCD of claim 17, wherein adjacent two pixels in a column direction have different polarities of the data voltage with respect to the common voltage.

19. The LCD of claim 17, further comprising a plurality of common electrodes formed on the substrate, wherein the pixel electrodes are formed on the common electrodes.

20. The LCD of claim 19, wherein the common electrode is parallel to the pixel electrode.

21. The LCD of claim 20, each common electrode is arranged between two adjacent pixel electrodes.

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